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Hu

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(54) **PLASTIC FAUCET BODY WITH COPPER CONNECTING LEGS**

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F16K 27/06 (2006.01)
E03C 1/04 (2006.01)

(52) **U.S. Cl.**
USPC **137/315.12**; 137/801; 4/676

(58) **Field of Classification Search**
USPC 137/801, 624.4, 624.41, 328, 315.12; 4/775–778
See application file for complete search history.

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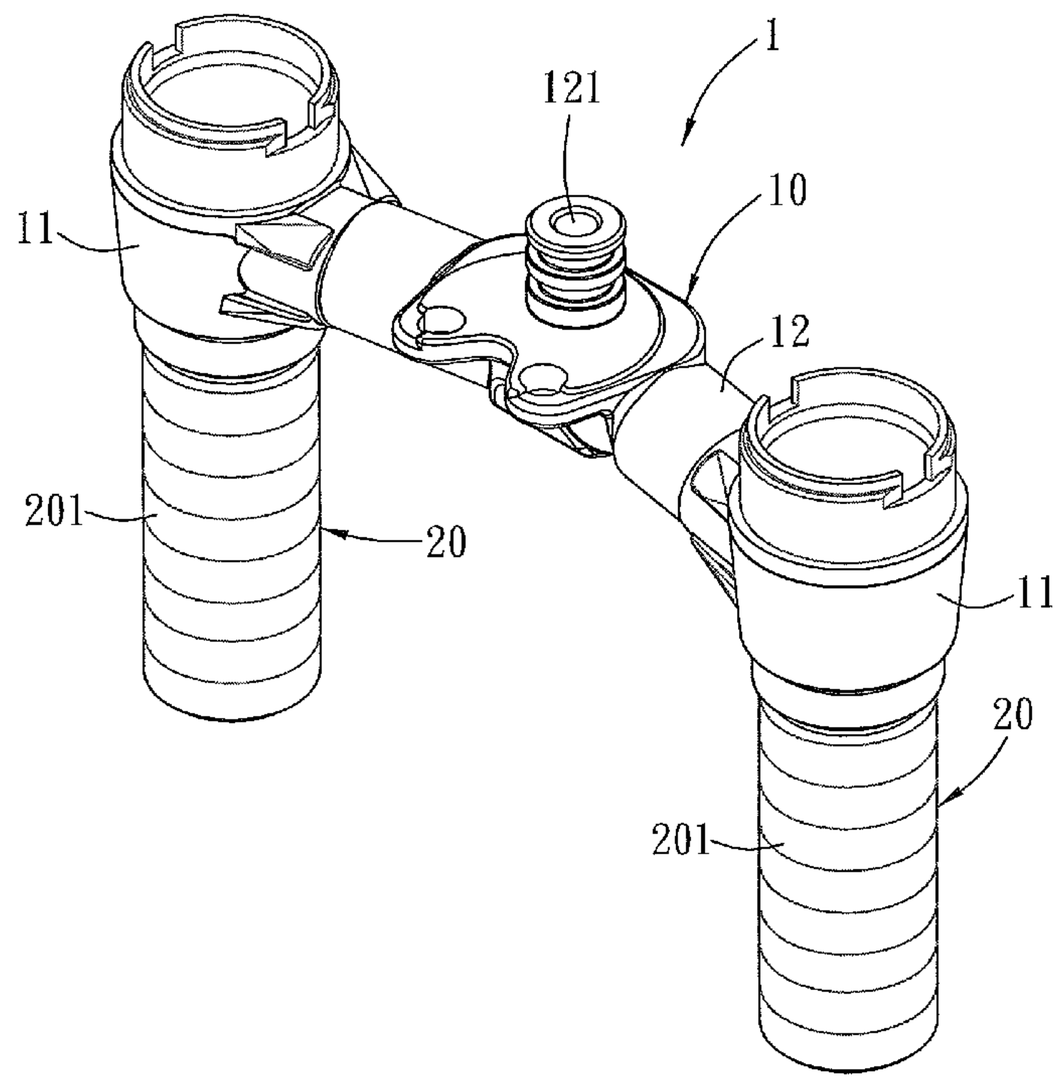
(57) **ABSTRACT**

A plastic faucet body with copper connecting legs contains a plastic member including two seat portions, a connecting portion, and two support feet; each support foot having an inlet and a channel; the connecting portion having at least one exit and a tunnel; two copper connecting legs, each being engaged on the each support foot and having a threaded section; wherein a bottom end of the each copper connecting leg extends a predetermined distance from the each support foot so as to define a fitting section on the each copper connecting leg; a lower coupling portion is formed on a connection zone of the each support foot and the each copper connecting leg; a plastic sleeve has at least one seal element to provide a sealing effect and to prevent water from leakage via the lower coupling portion and has a seal inner face formed on the plastic sleeve.

12 Claims, 8 Drawing Sheets



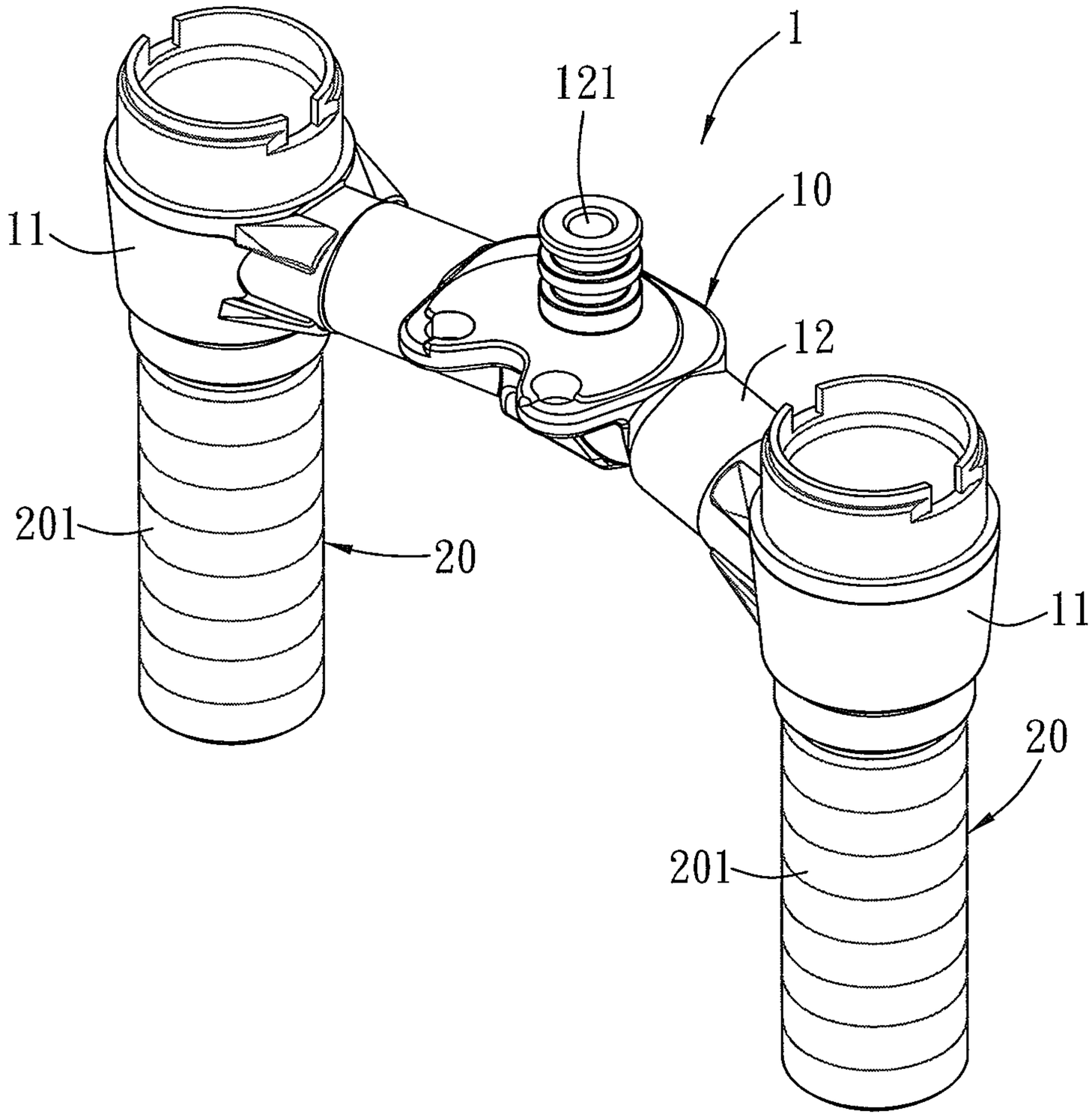


FIG. 1

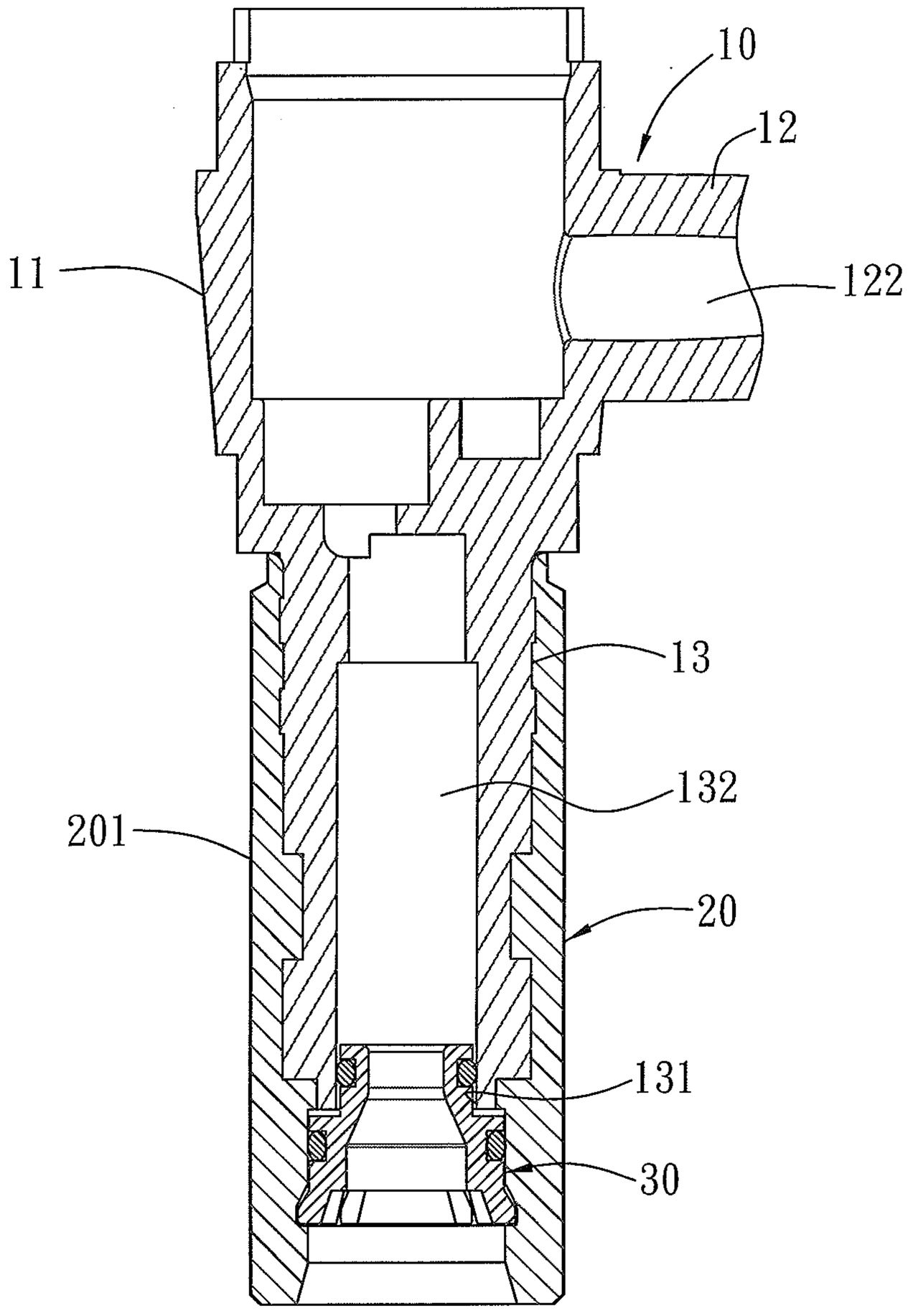


FIG. 2

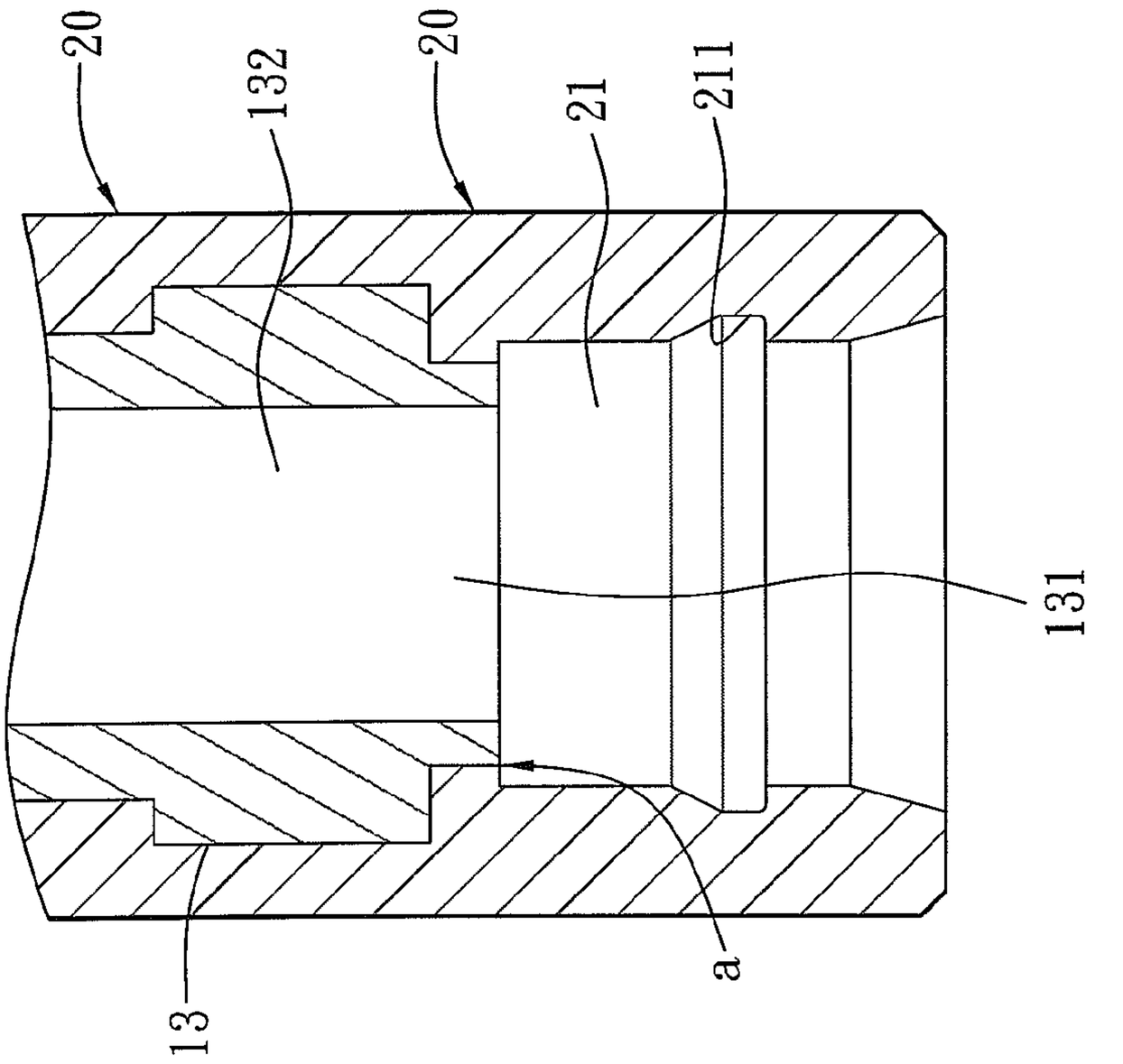

20
132
20
21
211
131
13
a

FIG. 4

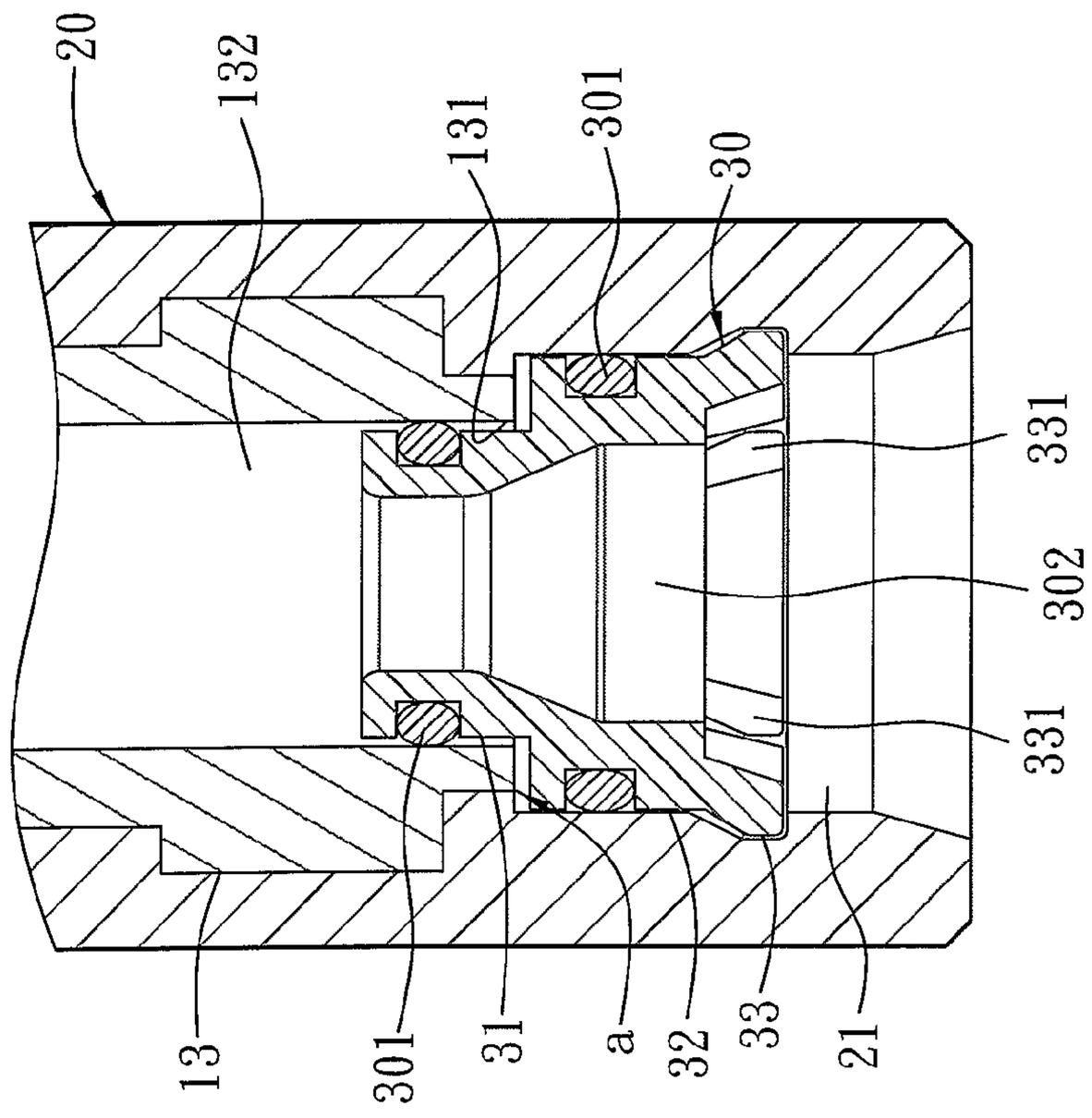

20
132
131
301
30
331
302
331
13
301
31
a
32
33
21

FIG. 3

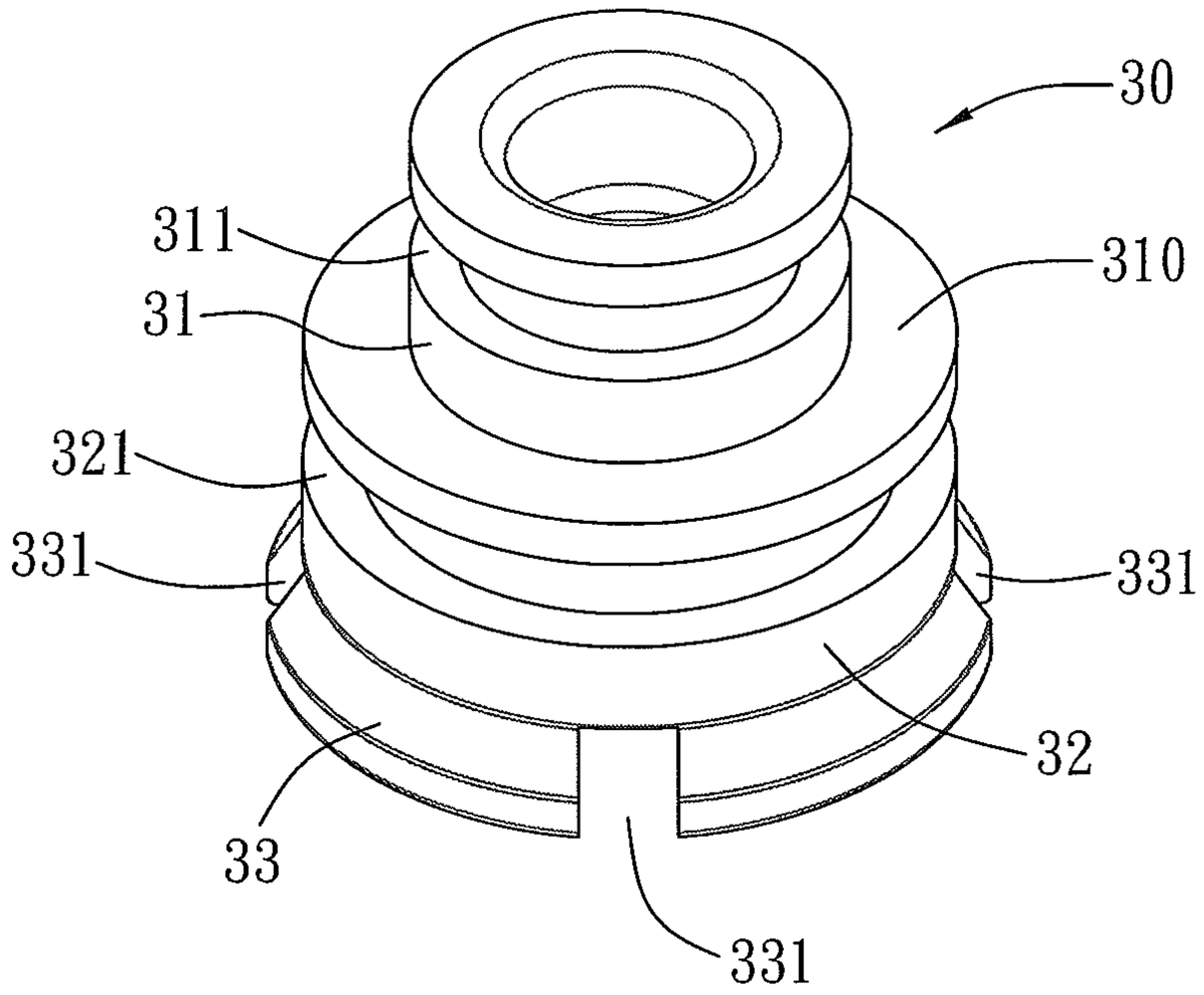

30
311
310
31
321
331
331
32
33
331

FIG. 5

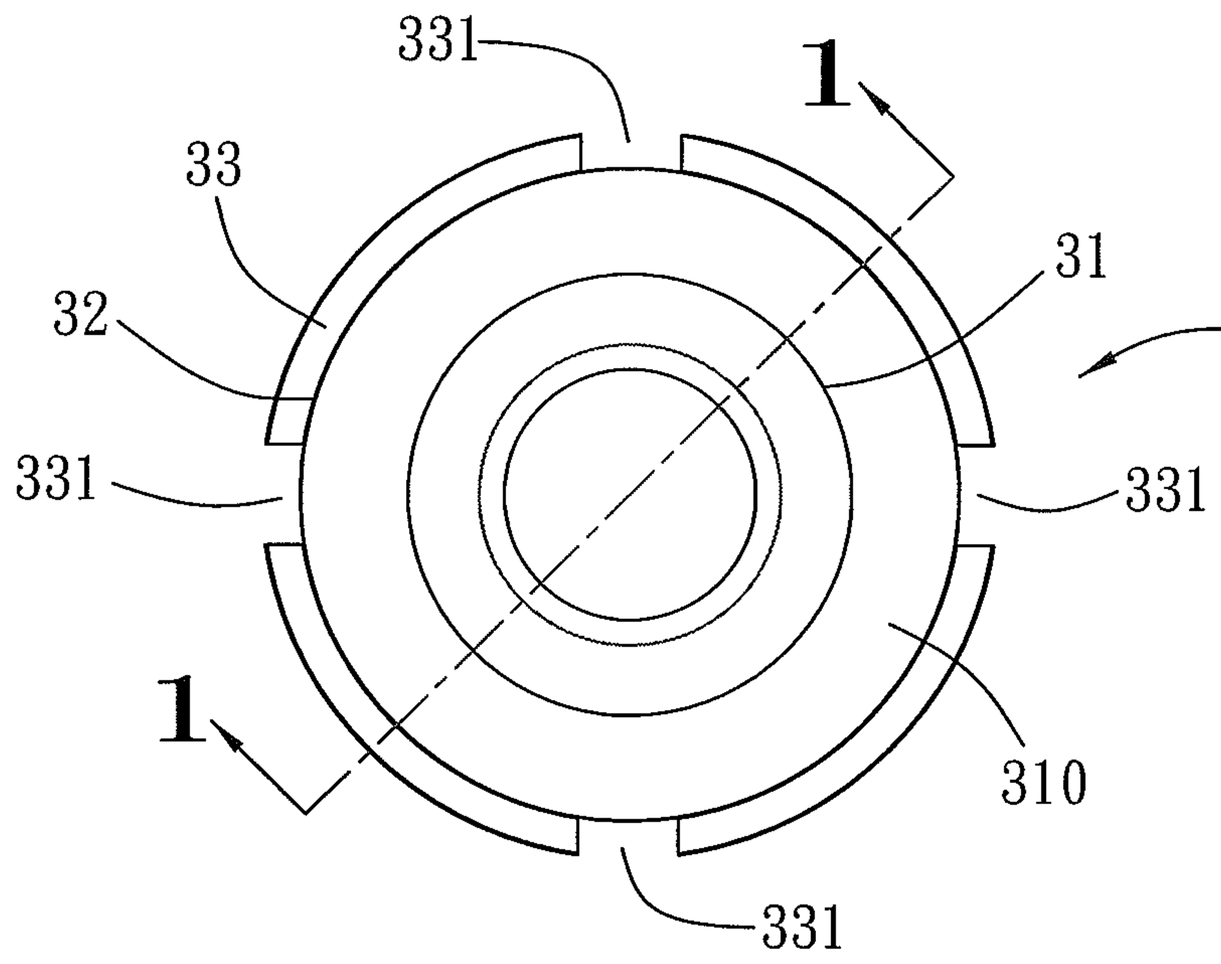

331
1
33
31
32
30
331
331
1
310
331

FIG. 6

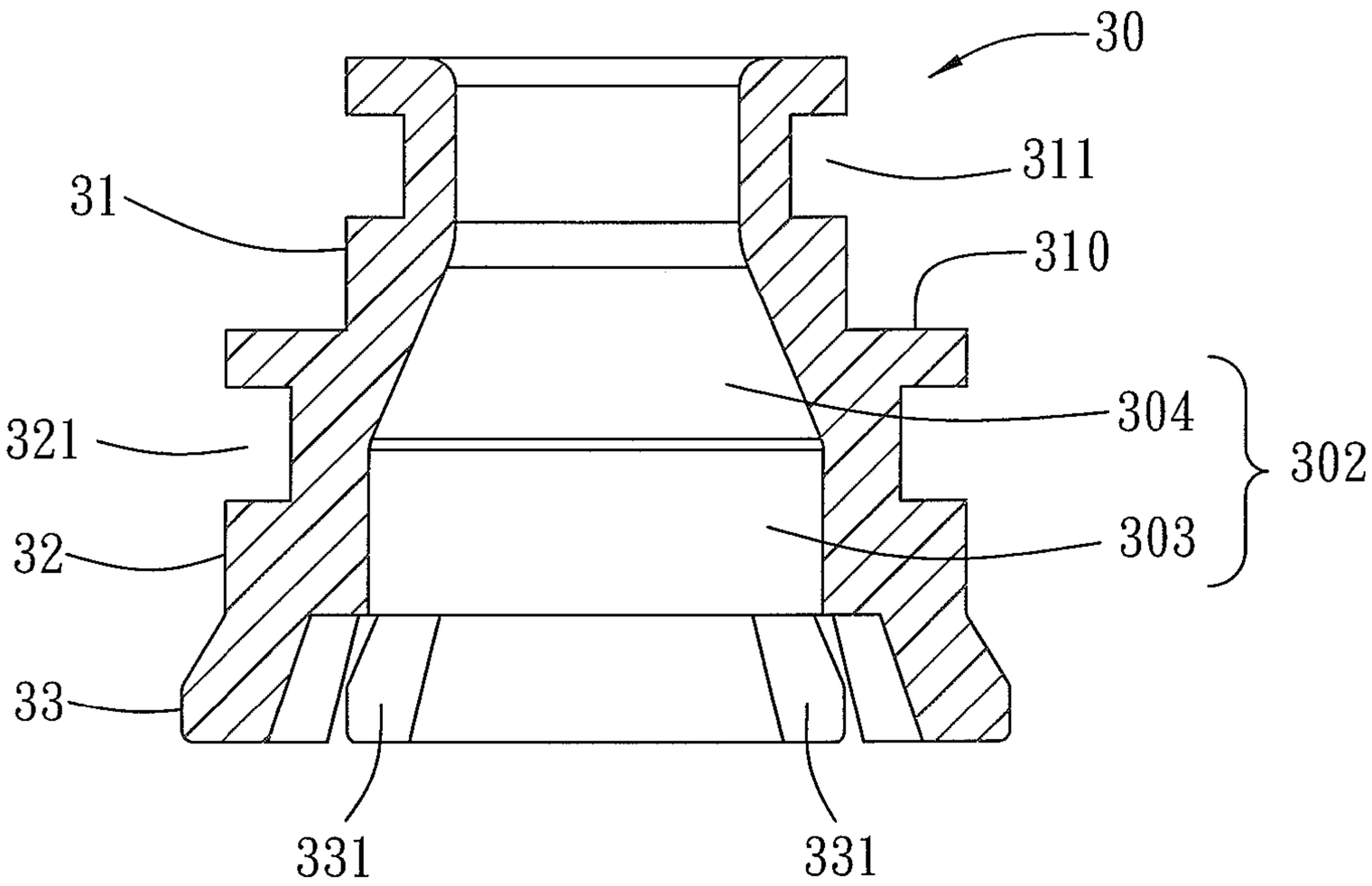

30
311
31
310
304
321
302
303
32
33
331
331

FIG. 7

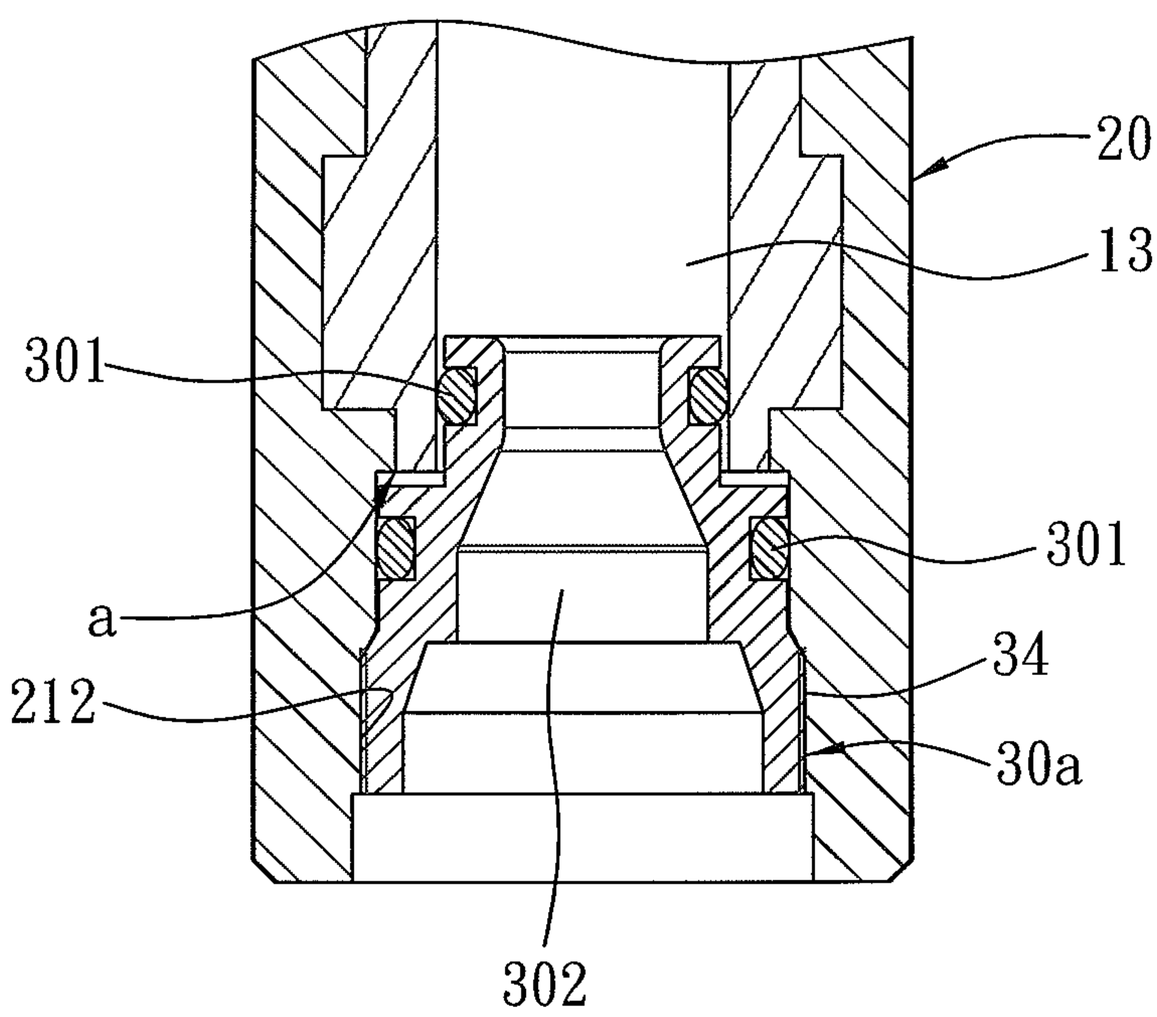

20
132
301
301
a
34
212
30a
302

FIG. 8

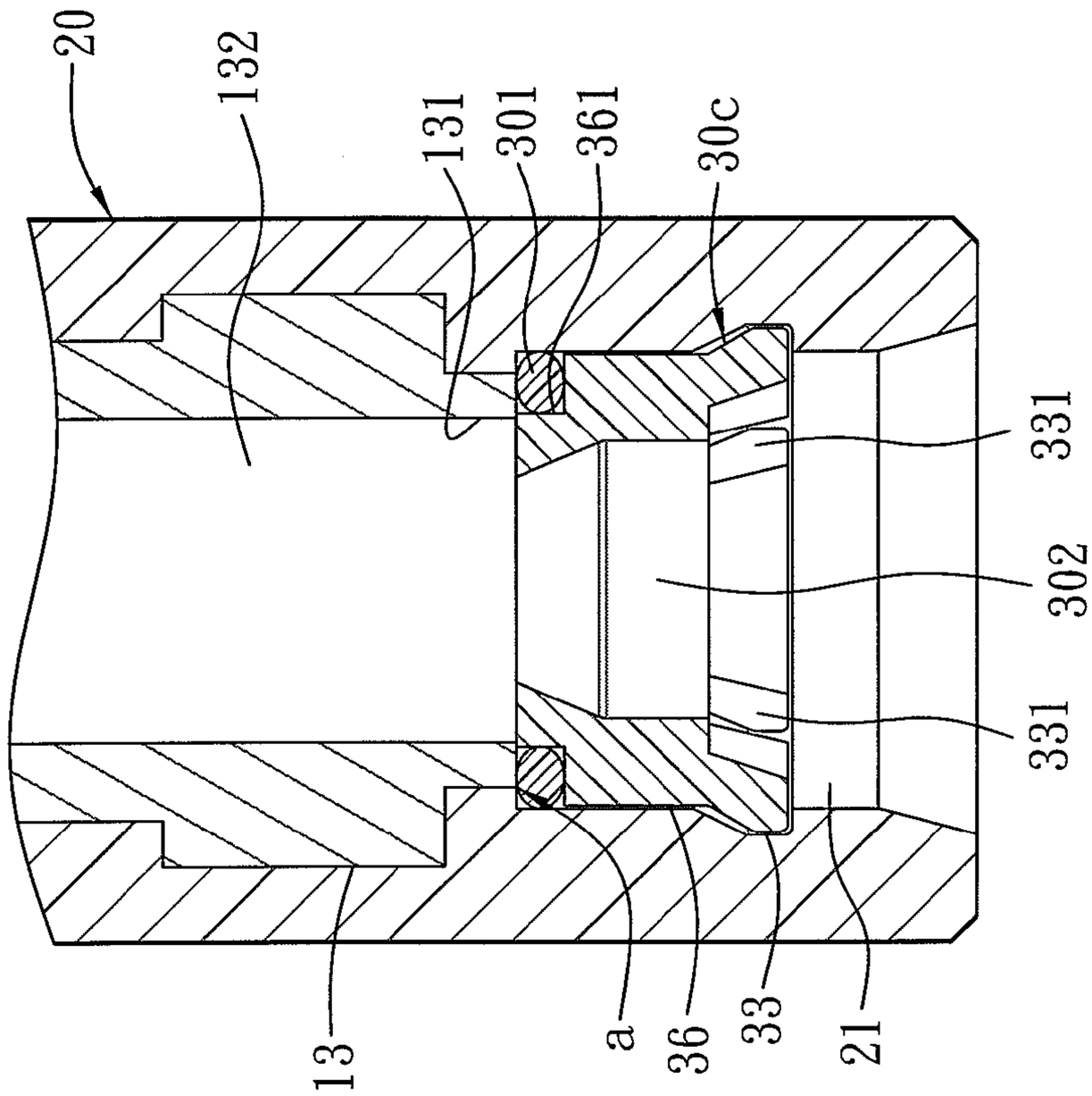

20
132
131
301
361
30c
331
302
331
13
a
36
33
21

FIG. 10

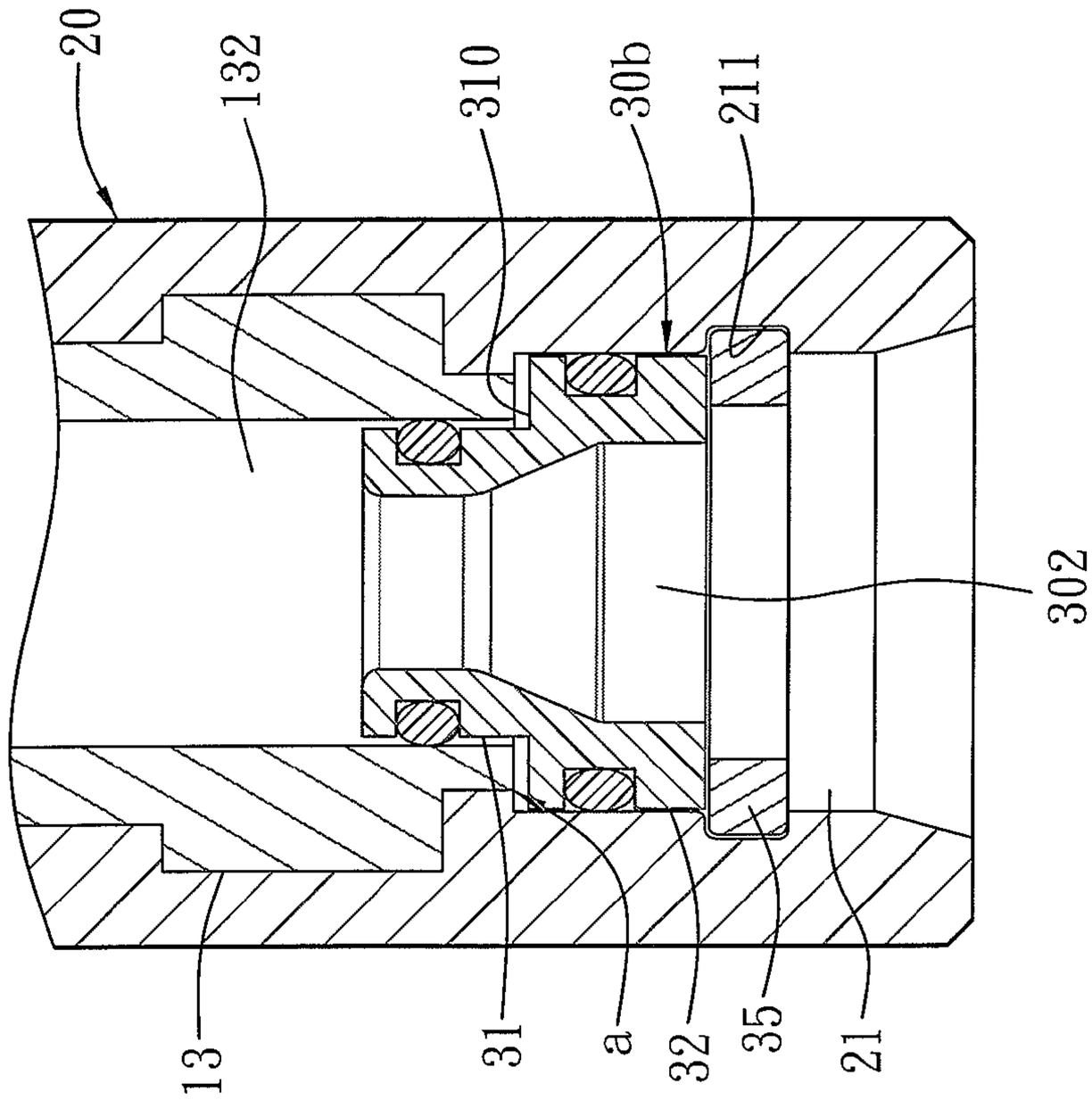

20
132
310
30b
211
302
13
31
a
32
35
21

FIG. 9

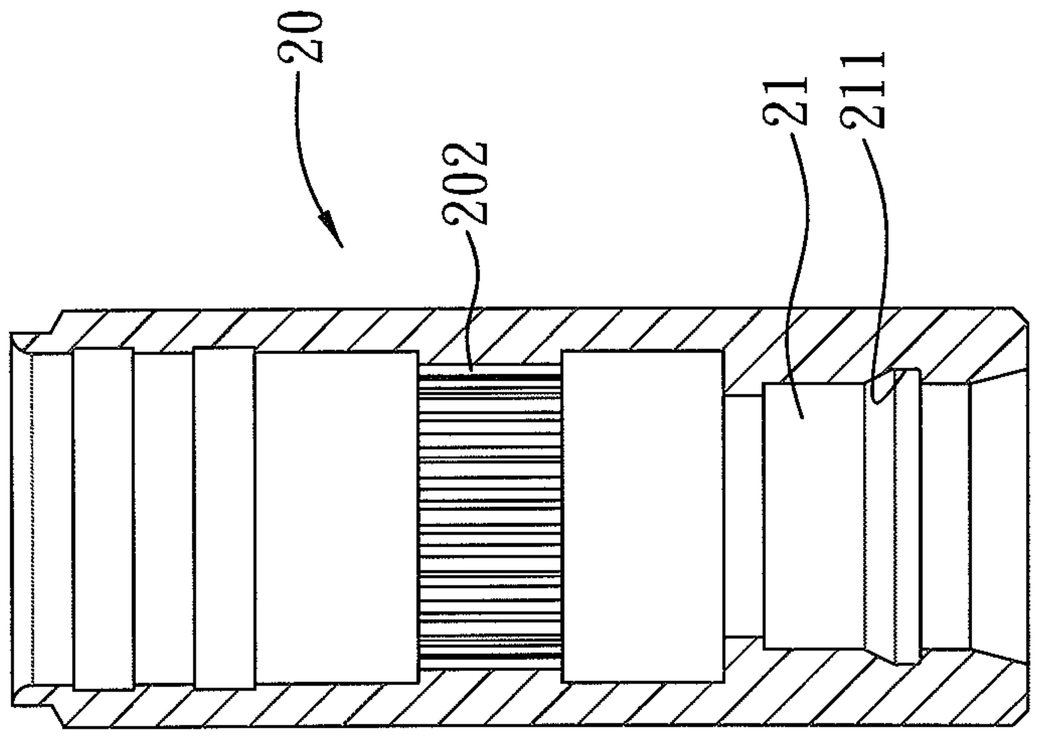


FIG. 12

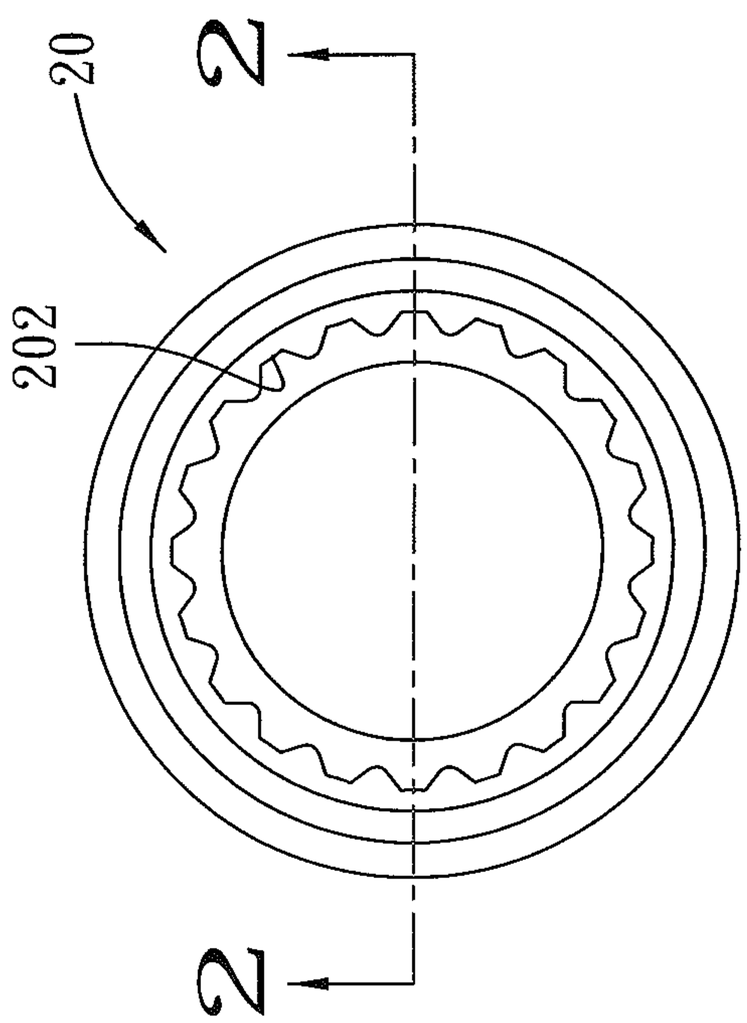


FIG. 11

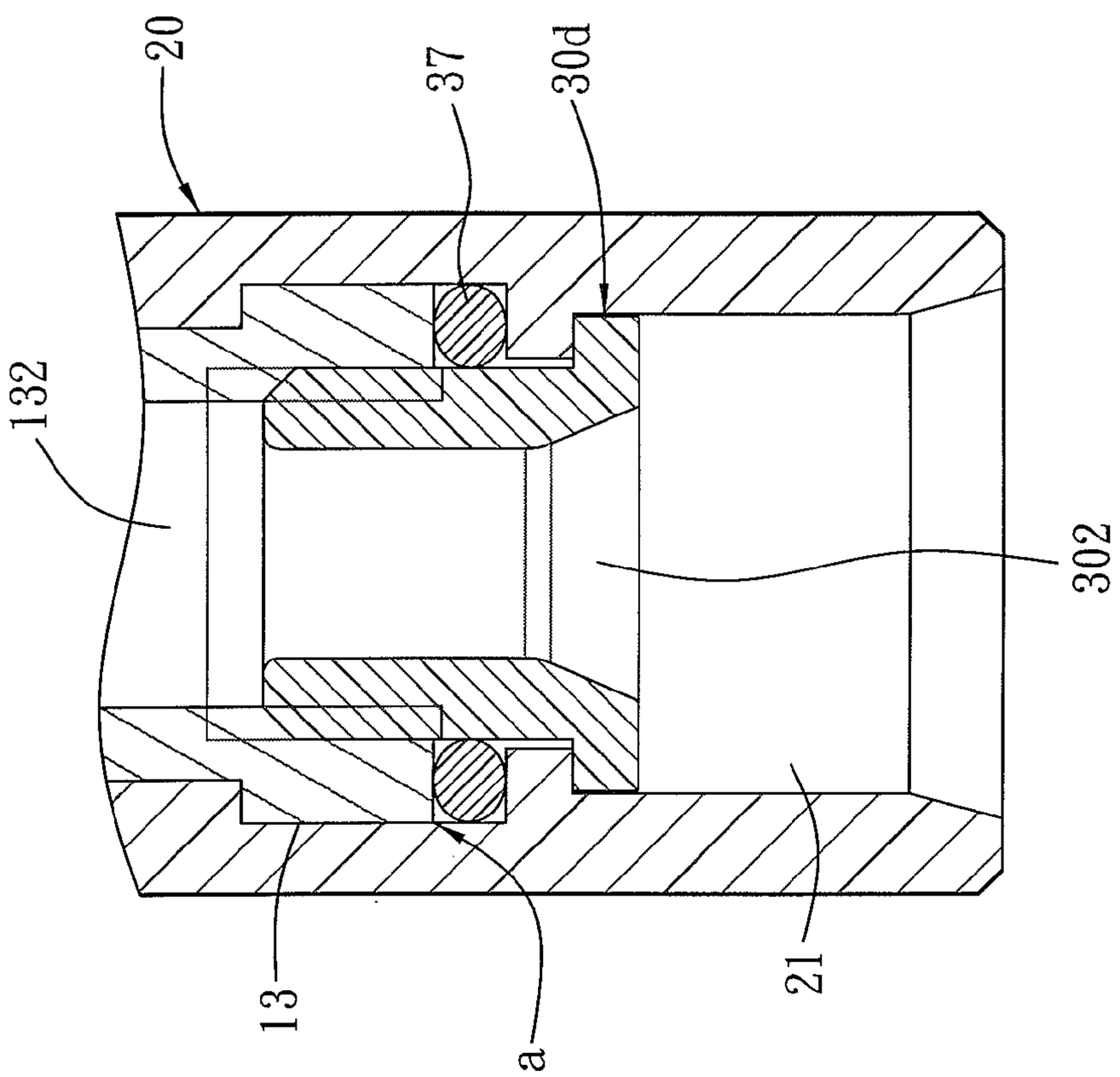


FIG. 13

PLASTIC FAUCET BODY WITH COPPER CONNECTING LEGS

FIELD OF THE INVENTION

The present invention relates to a plastic faucet body with copper connecting legs.

BACKGROUND OF THE INVENTION

Conventional faucet comprises a faucet body, and more particularly to a H-shaped faucet body with two inlets. This H-shaped faucet body comprises two seat portions mounted on two sides thereof, a connecting portion defined between the two seat portions, and two support feet extending downwardly from two bottom ends of the two seat portions. Each support foot has an inlet formed on a bottom end thereof for flowing cold water or hot water and has a channel for communicating with each seat portion. The each seat portion is used to receive a valve member controlled by a handle. The connecting portion has at least one outlet defined on a middle section thereof so as to connect with a water pipe or a shower via a hole.

To fix the faucet body, each support foot has outer threads molded on an outer surface thereof so as to screw with a washbasin by ways of a nut, and then a cover is covered in the washbasin, thus connecting the faucet body.

It is well known that the handle is provided to control the valve member so that the hot water and the cold water flow into the at least one outlet at a desired ratio, thus controlling water temperature.

Conventional faucet body is casting molded from copper material, so sand core and sand mold are required prior to casting mold the faucet body, and copper liquid is poured, finally the sand core is removed. In addition, the faucet body is machined, including reaming, drilling, and milling. But the machining process is complicated and takes a long time. Likewise, the tools for machining the faucet body are damaged easily, and the faucet body is casting molded from copper material, thereby casing high production cost.

A conventional integrally plastic faucet body and a method for making thereof are disclosed in CN Publication No. 101664980. A faucet body is overmolded from plastic material, and two support feet are made of plastic material, wherein each support foot has a toothed component or a copper leg insert molded from copper material, thus producing the faucet body made of copper material and plastic material. However, a slit generates on a connection zone of the copper leg and the support foot, thus leaking water and having water pollution.

The present invention has arisen to mitigate and/or obviate the afore-described disadvantages.

SUMMARY OF THE INVENTION

The primary object of the present invention is to provide a plastic faucet body with copper connecting legs which is capable of overcoming the shortcomings of the conventional plastic faucet body with copper connecting legs.

To obtain the above objectives, a plastic faucet body with copper connecting legs provided by the present invention contains:

a plastic member injection molded from plastic material and includes two seat portions mounted on two sides thereof, a connecting portion defined between the two seat portions, and two support feet extending downwardly from two bottom ends of the two seat portions; each support foot having an inlet formed on a bottom end thereof and a channel arranged in the each support foot and communicating with each seat portion; the connecting portion having at least one exit defined on a middle section thereof and having a tunnel defined therein and communicating with the each seat portion;

two copper connecting legs made of cooper material, and each copper connecting leg being engaged on an outer wall of the each support foot of the plastic member and having a threaded section formed on the outer wall thereof; characterized in that:

a bottom end of the each copper connecting leg extends a predetermined distance from a bottom end of the each support foot so as to define a fitting section on an inner wall of the each copper connecting leg;

a lower coupling portion is formed on a connection zone of the bottom end of the each support foot and the inner wall of the each copper connecting leg;

a plastic sleeve, at least one part of which is engaged with the fitting section of the each copper connecting leg, the plastic sleeve has at least one seal element fitted on an outer wall thereof so as to provide a sealing effect and to prevent water from leakage via the lower coupling portion and has a seal inner face formed on an inner wall of the plastic sleeve.

Unlike conventional faucet body with copper connecting legs, a length of the each copper connecting leg of the prevent invention is longer than that of the each support foot of the prevent invention so that the each copper connecting leg has the fitting section, and the connection zone of the bottom end of the each support foot and the inner wall of the each copper connecting leg (i.e., the lower coupling portion) is moved to a more upper position. Accordingly, when the fitting section of the each copper connecting leg connects with the plastic sleeve, one or two seal elements of the plastic sleeve are used to prevent water, flowing through the channel of the each support foot, from contacting with the lower coupling portion, thus avoiding water from leakage via the lower coupling portion.

The foregoing, as well as additional objects, features and advantages of the invention will be more readily apparent from the following detailed description, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view showing the assembly of a plastic faucet body with copper connecting legs according to a first embodiment of the present invention.

FIG. **2** is a cross sectional view showing the assembly of a part of the plastic faucet body with copper connecting legs according to the first embodiment of the present invention.

FIG. **3** is a partial cross sectional view showing the assembly of a faucet body of the first embodiment of the present invention being fixed in a plastic sleeve.

FIG. **4** is a partial cross sectional showing the assembly of two copper connecting legs and two support feet according to the first embodiment of the present invention.

FIG. **5** is a perspective view showing the assembly of the plastic faucet body with copper connecting according to the first embodiment of the present invention.

FIG. **6** is a plan view showing the assembly of the plastic faucet body with copper connecting according to the first embodiment of the present invention.

FIG. **7** is a cross sectional view taken along the line **1-1** of FIG. **6**.

FIG. **8** is a partial cross sectional view showing a plastic sleeve fixed in a faucet body according to a second embodiment of the present invention.

FIG. **9** is a partial cross sectional view showing a plastic sleeve fixed in a faucet body according to a third embodiment of the present invention.

FIG. **10** is a partial cross sectional view showing a plastic sleeve fixed in a faucet body according to a fourth embodiment of the present invention.

FIG. **11** is a plan view showing the assembly of a copper connecting leg of the faucet body according to the present invention.

FIG. **12** is a cross sectional view taken along the line **2-2** of FIG. **11**.

FIG. **13** is a partial cross sectional view showing a plastic sleeve fixed in a faucet body according to a fifth embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. **1-3** show a plastic faucet body with copper connecting legs according to a first embodiment of the present invention. A faucet body **1** comprises a plastic member **10** and two copper connecting legs **20**.

The plastic member **10** is injection molded from plastic material and includes two seat portions **11** mounted on two sides thereof, a connecting portion **12** defined between the two seat portions **11**, and two support feet **13** extending downwardly from two bottom ends of the two seat portions **11**. As shown in FIG. **4**, each support foot **13** has an inlet **131** formed on a bottom end thereof and has a channel **132** arranged in the each support foot **13** and communicating with each seat portion **11**. The connecting portion **12** has at least one exit **121** defined on a middle section thereof and has a tunnel **122** defined therein and communicating with the each seat portion **11**.

The two copper connecting legs **20** are made of cooper material, and each copper connecting leg **20** is engaged on an outer wall of the each support foot **13** of the plastic member **10** and has a threaded section **201** formed on the outer wall thereof.

An improvement of the plastic faucet body of the present invention contains:

a bottom end of the each copper connecting leg **20** extending a predetermined distance from a bottom end of the each support foot **13** so as to define a fitting section **21** on an inner wall of the each copper connecting leg **20**, as illustrated in FIGS. **3** and **4**;

a lower coupling portion a formed on a connection zone of the bottom end of the each support foot **13** and the inner wall of the each copper connecting leg **20**;

a plastic sleeve **30**, as shown in FIGS. **5-7**, its at least one part is engaged with the fitting section **21** of the each copper connecting leg **20**, the plastic sleeve **30** having two seal elements **301** fitted on an outer wall thereof so as to provide a sealing effect and to prevent water from leakage via the lower coupling portion a and having a seal inner face **302** formed on an inner wall of the plastic sleeve **30** so as to connect with a flat surface or a conical portion of a cold water pipe or a hot water pipe. To facilitate a contact of the flat surface or the conical portion of the cold water pipe or the hot water pipe with the seal inner face **302**, the seal inner face **302** has a circularly groove-shaped face **303** arranged on a lower end thereof and a conically inner face **304** connecting with an upper end of the circularly groove-shaped face **303**.

The plastic sleeve **30** is formed in a plug shape and includes an upper closing portion **31**, a lower closing portion **32** connecting with a bottom end of the upper closing portion **31**, and a flexible retaining portion **33** coupling with a bottom end of the lower closing portion **32**. A diameter of the upper closing portion **31** is smaller than that of the lower closing portion **32**, so the upper closing portion **31** is placed into the channel **132** from the bottom end of the each support foot **13**, and the lower closing portion **32** is engaged in the fitting section **21** of the each copper connecting leg **20**. Also, between a connection zone of the upper closing portion **31** and the lower closing portion **32** is defined a stepped tab **310** relative to the lower coupling portion a.

The upper closing portion **31** has a first peripheral recess **311** defined on an outer wall thereof, and the lower closing portion **32** has a second peripheral recess **321** defined on an outer wall thereof, such that one of the two seal elements **301** (such as a rubber seal ring) is fitted in the first peripheral recess **311** and contacts with an inner wall of the each support foot **13** adjacent to the bottom end of the each support foot **13**, and another of the two seal elements **301** is fitted in the second peripheral recess **321** and contacts with an inner wall of the fitting section **21** of the each copper connecting leg **20**. Since the lower coupling portion a is defined between the two seal elements **301**, the water does not permeate into the lower coupling portion a, thus further preventing the water from leakage via the lower coupling portion a.

To fix the plastic sleeve **30** securely, the fitting section **21** of the each copper connecting leg **20** has a peripheral slot **211** formed on the inner wall thereof so as to engage with the flexible retaining portion **33**. The flexible retaining portion **33** of the plastic sleeve **30** has a plurality of notches **331** arranged around an external rim thereof and spaced apart from each other so that the flexible retaining portion **33** retracts and expands flexibly, such that after the flexible retaining portion **33** is pressed, it flexibly retracts into the plurality of notches **331**, and after a pressing force diminishes completely or partially, the flexible retaining portion **33** flexibly expands and then retains in the plurality of notches **331**. In assembly, the plastic sleeve **30** is forced upwardly to the each copper connecting leg **20** so that the bottom end of the each copper connecting leg **20** retains into the plurality of notches **331** of the flexible retaining portion **33**, thus assembling the plastic sleeve **30**.

Referring further to FIG. **8**, a difference of a plastic faucet body with copper connecting legs of a second embodiment of the present invention from that of the first embodiment comprises:

a plastic sleeve **30***a* having an external screwing section **34** for replacing the flexible retaining portion **33** of the first embodiment and having an internal screwing section **212** formed on a fitting section **21** of each of two copper connecting legs **20** so as to replace the peripheral slot **211** of the first embodiment, such that the external screwing section **34** of the plastic sleeve **30***a* screws with the internal screwing section **212** of the fitting section **21**, thus connecting the plastic sleeve **30***a* with the each of two copper connecting legs **20**

As shown in FIG. **9**, a difference of a plastic faucet body with copper connecting legs of a third embodiment of the present invention from that of the first embodiment comprises:

a plastic sleeve **30***b* having a flexible locking element **35** for replacing the flexible retaining portion **33** of the first embodiment, wherein the locking element **35** is a C-shaped snap ring or an E-shaped snap ring, etc. The plastic faucet body of this third embodiment also comprises a peripheral slot **211** of a fitting section **21** of each of two copper connecting legs **20** so as to retain with the locking element **35**, such that the plastic sleeve **30***b* is limited to axially move downward. Also, between a connection zone of an upper closing portion **31** and a lower closing portion **32** of the plastic sleeve **30***b* is defined

a stepped tab **310**, so the plastic sleeve **30***b* axially moves upward. Thereby, the plastic sleeve **30***b* is limited in the fitting section **21**.

As shown in FIG. **10**, a difference of a plastic faucet body with copper connecting legs of a fourth embodiment of the present invention from that of the first embodiment comprises:

a plastic sleeve **30***c* having a closing portion **31** identical to the lower closing portion **32** of the first embodiment without the upper closing portion **31** of the first embodiment, and the closing portion **31** having a stepped trench **361** defined on an outer wall of a top end thereof so as to engage a seal element **301** (such as a rubber seal ring). In addition, a position of the stepped trench **361** of this fourth embodiment is different from that of the first peripheral recess **311** of the first embodiment, such that the seal element **301** of the fourth embodiment closes a lower coupling portion a of the fourth embodiment, thus preventing water from leakage.

Unlike conventional faucet body with copper connecting legs, a length of the each copper connecting leg **20** of the prevent invention is longer than that of the each support foot **13** of the prevent invention so that the each copper connecting leg **20** has the fitting section **21**, and the connection zone of the bottom end of the each support foot **13** and the inner wall of the each copper connecting leg **20** (i.e., the lower coupling portion a) is moved to a more upper position. Accordingly, when the fitting section **21** of the each copper connecting leg **20** connects with the plastic sleeve **30**, one or two seal elements **301** of the plastic sleeve **30** are used to prevent water, flowing through the channel **132** of the each support foot **13**, from contacting with the lower coupling portion a, thus avoiding water from leakage via the lower coupling portion a.

In addition, the plastic sleeves except for that of the fourth embodiment are engaged with the fitting section **21** of the each copper connecting leg **20** and in the channel **132** of the each support foot **13**. Thereby, the plastic sleeve **30** is partially or completely engaged in the fitting section **21**.

To avoid a disengagement of the two copper connecting legs **20** from the each support foot **13**, as shown in FIGS. **11** and **12**, an anti-rotation structure is provided between the two copper connecting legs **20** and the each support foot **13**. The anti-rotation structure includes a plurality of vertical troughs **202** formed around a middle section of the inner wall of the each copper connecting leg **20** so as to retain with the each support foot **13**.

As illustrated in FIG. **13**, a plastic faucet body with copper connecting legs according to a fifth embodiment of the present invention comprises: a sealing pad **37** or an O-shaped ring fixed between a bottom end of each support foot **13** and each connecting leg **20** when the each support foot **13** retains with the each connecting leg **20**, and a plastic sleeve **30***d* is screwed into a channel **132** of the each support foot **13** so as to limit the sealing pad **37** or the O-shaped ring and to form a seal inner face **302**, thus obtaining a sealing effect as well.

While the preferred embodiments of the invention have been set forth for the purpose of disclosure, modifications of the disclosed embodiments of the invention as well as other embodiments thereof may occur to those skilled in the art. Accordingly, the appended claims are intended to cover all embodiments which do not depart from the spirit and scope of the invention.

What is claimed is:

1. A plastic faucet body with copper connecting legs comprising:

a plastic member injection molded from plastic material and includes two seat portions mounted on two sides thereof, a connecting portion defined between the two seat portions, and two support feet extending downwardly from two bottom ends of the two seat portions; each support foot having an inlet formed on a bottom end thereof and a channel arranged in the each support foot and communicating with each seat portion; the connecting portion having at least one exit defined on a middle section thereof and having a tunnel defined therein and communicating with the each seat portion;

two copper connecting legs made of cooper material, and each copper connecting leg being engaged on an outer wall of the each support foot of the plastic member and having a threaded section formed on the outer wall thereof; characterized in that:

a bottom end of the each copper connecting leg extends a predetermined distance from a bottom end of the each support foot so as to define a fitting section on an inner wall of the each copper connecting leg;

a lower coupling portion is formed on a connection zone of the bottom end of the each support foot and the inner wall of the each copper connecting leg;

a plastic sleeve, at least one part of which is engaged with the fitting section of the each copper connecting leg, the plastic sleeve has at least one seal element fitted on an outer wall thereof so as to provide a sealing effect and to prevent water from leakage via the lower coupling portion and has a seal inner face formed on an inner wall of the plastic sleeve.

2. The plastic faucet body with copper connecting legs as claimed in claim **1**, characterized in that the at least one seal element is a rubber seal ring.

3. The plastic faucet body with copper connecting legs as claimed in claim **1**, characterized in that the plastic sleeve is formed in a plug shape and includes an upper closing portion, a lower closing portion connecting with a bottom end of the upper closing portion, and a flexible retaining portion coupling with a bottom end of the lower closing portion; one of the at least one seal element is fitted on an outer wall of the upper closing portion, and another of the at least one seal element is fitted on an outer wall of the lower closing portion, such that the at least one seal element contact with an inner wall of the each support foot adjacent to the bottom end of the each support foot and an inner wall of the fitting section of the each copper connecting leg; the fitting section of the each copper connecting leg has a peripheral slot formed on the inner wall of the fitting section so as to engage with the flexible retaining portion of the plastic sleeve.

4. The plastic faucet body with copper connecting legs as claimed in claim **3**, characterized in that a diameter of the upper closing portion of the plastic sleeve is smaller than that of the lower closing portion, and between a connection zone of the upper closing portion and the lower closing portion is defined a stepped tab relative to the lower coupling portion; the flexible retaining portion of the plastic sleeve has a plurality of notches arranged around an external rim thereof and spaced apart from each other, such that after the flexible retaining portion is pressed, it flexibly retracts into the plurality of notches and flexibly expands and then retains in the plurality of notches.

5. The plastic faucet body with copper connecting legs as claimed in claim **3**, characterized in that the upper closing portion of the plastic sleeve has a first peripheral recess defined on the outer wall thereof, and the lower closing portion has a second peripheral recess defined on the outer wall thereof; the at least one seal element is a rubber seal ring fitted in the first peripheral recess and the second peripheral recess.

6. The plastic faucet body with copper connecting legs as claimed in claim **1**, characterized in that characterized in that

the plastic sleeve is formed in a plug shape and includes an upper closing portion, a lower closing portion connecting with a bottom end of the upper closing portion, and an external screwing section coupling with a bottom end of the lower closing portion; one of the at least one seal element is fitted on an outer wall of the upper closing portion, and another of the at least one seal element is fitted on an outer wall of the lower closing portion, such that the at least one seal element contact with an inner wall of the each support foot adjacent to the bottom end of the each support foot and an inner wall of the fitting section of the each copper connecting leg; the fitting section of the each copper connecting leg has an internal screwing section formed on the inner wall of the fitting section so as to screw with the external screwing section of the plastic sleeve.

7. The plastic faucet body with copper connecting legs as claimed in claim **6**, characterized in that a diameter of the upper closing portion of the plastic sleeve is smaller than that of the lower closing portion, and between a connection zone of the upper closing portion and the lower closing portion is defined a stepped tab relative to the lower coupling portion; the upper closing portion of the plastic sleeve has a first peripheral recess defined on an outer wall thereof, and the lower closing portion has a second peripheral recess defined on an outer wall thereof; the at least one seal element is a rubber seal ring fitted in the first peripheral recess and the second peripheral recess.

8. The plastic faucet body with copper connecting legs as claimed in claim **1**, characterized in that the plastic sleeve has a flexible locking element; the plastic sleeve is formed in a plug shape and includes an upper closing portion and a lower closing portion connecting with a bottom end of the upper closing portion; one of the at least one seal element is fitted on an outer wall of the upper closing portion, and another of the at least one seal element is fitted on an outer wall of the lower closing portion, such that the at least one seal element contact with an inner wall of the each support foot adjacent to the bottom end of the each support foot and an inner wall of the fitting section of the each copper connecting leg; the fitting section of the each copper connecting leg has a peripheral slot formed on the inner wall of the fitting section so as to engage with the flexible retaining portion of the plastic sleeve, such that the plastic sleeve is limited by the flexible locking element so as to axially move downward.

9. The plastic faucet body with copper connecting legs as claimed in claim **8**, characterized in that a diameter of the upper closing portion of the plastic sleeve is smaller than that of the lower closing portion, and between a connection zone of the upper closing portion and the lower closing portion is defined a stepped tab relative to the lower coupling portion so ax to limit the plastic sleeve to axially move upward; the upper closing portion of the plastic sleeve has a first peripheral recess defined on the outer wall thereof, and the lower closing portion has a second peripheral recess defined on the outer wall thereof; the at least one seal element is a rubber seal ring fitted in first peripheral recess and the second peripheral recess; the flexible locking element is a C-shaped snap ring.

10. The plastic faucet body with copper connecting legs as claimed in claim **1**, characterized in that the plastic sleeve is formed in a plug shape and includes a closing portion and a flexible locking element connecting with a bottom end of the closing portion; one of the at least one seal element is fitted on an outer wall of the upper closing portion, and another of the at least one seal element is fitted on an outer wall of the lower closing portion, such that the at least one seal element contact with an inner wall of the each support foot adjacent to the bottom end of the each support foot and an inner wall of the fitting section of the each copper connecting leg; the fitting section of the each copper connecting leg has a peripheral slot formed on the inner wall of the fitting section so as to engage with the flexible retaining portion of the plastic sleeve, such that the plastic sleeve is limited by the flexible locking element so as to axially move downward; the closing portion has a seal element for closing the lower coupling portion.

11. The plastic faucet body with copper connecting legs as claimed in claim **10**, characterized in that the flexible retaining portion of the plastic sleeve has a plurality of notches arranged around an external rim thereof and spaced apart from each other, such that after the flexible retaining portion is pressed, it flexibly retracts into the plurality of notches and flexibly expands and then retains in the plurality of notches.

12. The plastic faucet body with copper connecting legs as claimed in claim **10**, characterized in that the closing portion of the plastic sleeve has a stepped trench defined on an outer wall of a top end thereof; the at least one seal element is a rubber seal ring fitted in the stepped trench.

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